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INTRODUCTION.

This REVIEW treats generally the meteorological conditions of the United States and Canada for July, 1888, and is based upon the reports of regular and voluntary observers of both countries. Descriptions of the storms that occurred over the north Atlantic Ocean are also given, and their approximate paths shown on chart i, on which also appears the distribution of icebergs and field-ice and the limits of fog-belts west of the fortieth meridian.

July was an unusually cool month in the upper Ohio valley and along the Atlantic coast from New England to Georgia, the greatest deficiencies in the monthly mean temperatures as compared with the normal occurring in the middle and south Atlantic states. In the Saint Lawrence Valley and over the central and northern portions of the country between the Mississippi Valley and Pacific coast the month was warmer than the average, but the departures from normal temperature were in general not marked.

The rainfall was below the average over the greater part of the country. In the Atlantic coast and east Gulf states, Ohio Valley, and middle and southern slopes it was, upon the whole, about twenty-five per cent. below the normal. In the upper Mississippi valley and on the north Pacific coast it was in excess of the average.

The remarkably heavy rains which accompanied the storms traced on chart i as numbers ii and v caused destructive freshets in the upper Ohio river and in smaller streams in adjacent states.

With this REVIEW is published a chart (vi) giving the average date of the first killing frost, as determined from data furnished by voluntary observers.

For the first time since the establishment of the Signal Service the means of all meteorological observations at stations of this service are published as determined from two observations taken at 8 a. m. and 8 p. m. The former system of tri-daily observations was on July 1, 1888, superseded by the plan of taking two observations at the hours named, and, as this latter plan has been permanently adopted, the means for Signal Service stations will hereafter be based upon but two observations.

In the preparation of this REVIEW the following data, received up to August 20, 1888, have been used, viz., the regular tri-daily weather-charts, containing data of simultaneous observations taken at 133 Signal Service stations and 20 Canadian stations, as telegraphed to this office; 178 monthly journals and 181 monthly means from the former and 20 monthly means from the latter: 360 monthly registers from voluntary observers; 59 monthly registers from United States Army post surgeons; marine records; international simultaneous observations; marine reports through the co-operation of the Hydrographic Office, United States Navy, and the "New York Herald Weather Service;" monthly weather reports from the local weather services of Alabama, Arkansas, Illinois, Indiana, Kansas, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Nebraska, Nevada, New England, New Jersey, North Carolina, Ohio, Oregon, Pennsylvania, South Carolina, Tennessee, and Texas, and the Central Pacific Railway Company; trustworthy newspaper extracts, and special reports.

ATMOSPHERIC PRESSURE (expressed in inches and hundredths).

The distribution of mean atmospheric pressure for July, 1888, determined from observations taken daily at 8 a. m. and 8 p. m., is shown by isobarometric lines on chart ii. This is the first month for which a chart exhibiting the mean pressure has been based upon but two observations daily. A protracted series of hourly observations has shown that the difference between the mean pressure determined from two observations taken at the hours above named and that determined from tri-daily observations, taken at eight-hour intervals, is so very slight as to be practically inappreciable. As the plan of taking tri-daily observations at Signal Service stations was on the first of July, 1888, superseded by that of taking but two at the hours stated, chart i will in the future exhibit mean pressures determined from two daily observations.

The mean pressure for July, 1888, was greatest on the south Atlantic coast, where it was slightly above 30.05, reaching a maximum of 30.08 at Atlanta, Ga. An isobar of 30.05 extends from northern Virginia southwestward to eastern Alabama, and thence south-southeastward to Key West, Fla. A second isobar of 30.05 is traced near the coasts of Washington Territory and Oregon; the area in this region over which the mean pressure reaches 30.05 (maximum, 30.06 at Olympia) is confined to the immediate coast of the Pacific and does not extend southward of Roseburg, Oregon. The regions of least pressure, like those of the greatest, occupy their normal positions, viz., the southern plateau and the extreme northeastern Canadian provinces, the mean pressure falling to 29.80 (at Yuma, Ariz.) in the former, and to 29.85 (at Father Point, Quebec) in the latter, making the range of mean pressure for the whole territory covered by the reporting stations .28.

As compared with the normal pressure for July, there has been a general excess over nearly the whole country, the only exceptions being the region along the Gulf coast and the extreme southwestern border from New Mexico to the Pacific coast, where the pressure was normal or slightly below. Where the pressure was above the normal the departures were less than .05 in all districts except the extreme northwest, Lake region, and middle Atlantic states, where they ranged from .05 to .08, the greatest departure occurring at Port Huron, Mich.

As compared with the previous month the mean pressure